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The insurance industry prepares for climate change

Interview with Evan Mills.

With the hurricane season about to start and Americans growing more exasperated with the failed recovery in New Orleans, expect a reenactment of last year's debate over whether global warming is causing a proliferation in the number of large hurricanes like Katrina. More papers are now working their way through peer review to further solidify the link between climate change and large hurricanes, but insurance executives are one group not interested in joining this spat. They grow more and more nervous as the increased frequency in natural disasters cuts into their profits.



The Association of British Insurers finds that weather-related losses now outpace trends in population growth and inflation. The association's analyses have identified changes in weather as the driver of a 2–4% annual increase in U.K. property losses.

Economists and business leaders are also taking notice. When the U.S. delegation failed to engage in efforts to curb emissions of carbon dioxide and other greenhouse gases (GHGs) during climate talks in Montreal last December, a group of 25 economists—including 3 Nobel Prize laureates and 1 former member of the President's Council of Economic Advisers—urged President Bush to drop his opposition to cuts in carbon emissions.

The rising costs from weather damage and agricultural losses far outweigh the price of curbing emissions, the economists wrote to Bush. Geoffrey Heal, an economist with the Columbia Business School, told the Financial Times, “The cost of implementing the

Kyoto Protocol is about 1% of GNP. That is about two quarters of growth.”

Further Reading

- Hurricanes—More Intense, More Frequent, More Expensive: Insurance in a Time of Changing Risks; Munich Re and American Re, 2006.
[View Article](#)
- Hurricane Katrina: Profile of a Super Cat—Lessons and Implications for Catastrophe Risk Management; Risk Management Solutions, August 2005.
[View Article](#) [896KB PDF]
- Availability and Affordability of Insurance Under Climate Change: A Growing Challenge for the U.S.; Ceres, Dec 2005.
[View Article](#)
- An Abrupt Climate Change Scenario and Its Implications for United States National Security; report to the Pentagon by Global Business Network, Oct 2003.
[View Article](#)

As the world’s largest industry, the insurance business faces more financial risk from global warming than any other sector of the economy. To better understand how business leaders are dealing with the dilemma, *ES&T* spoke with [Evan Mills](#), a staff scientist at the U.S. Department of Energy’s Lawrence Berkeley National Laboratory.

In the past 15 years, Mills has distinguished himself as an expert on the economic risks posed by climate change. In a [study](#) in *Science* last August, he detailed how global warming stands to hurt the insurance industry. He further explicated this work in a recent [report](#) released by [Ceres](#), a network of investors and public interest groups that promote environmental stewardship on the part of corporations. And his work in beginning to find its way into popular publications, including [Consumer Reports](#), [The New Yorker](#), and [Forbes](#).

As scientists such as Mills are beginning to discover, climate change can no longer be dismissed as just another environmental problem.

Now, it’s all about business.

Right now, the media seems to be caught in a debate over whether hurricanes are becoming stronger because of global warming. What does the insurance industry predict?

Earlier this year, the insurers' catastrophe [CAT] modelers unveiled their first attempt to incorporate the implications of climate change and other factors in the outlook for hurricane losses. The net result was an approximately 45% increase in previously expected insured losses due to changes in the physical characteristics of the extreme weather events alone. Demographic trends are amplifying these increases.

Responsible insurers are continuing to watch the science unfold.

When did the insurance industry first recognize the potential costs of climate change?

Remarkably, the issue was first publicly flagged by [Munich Re](#) way back in 1973. European and Asian insurers first engaged in the work with the Intergovernmental Panel on Climate Change [IPCC] in the late 1980s, but it's only recently that U.S. insurers have begun to take notice.

[Note: Munich Re is the world's second-largest company in reinsurance—they insure other insurance companies.]

For some time, the business community, specifically the oil and gas industry, has waged a campaign to magnify scientific uncertainties. Plus, they consistently highlight studies that show that controlling CO₂ emissions creates burdensome economic costs. Why do the insurance companies buy into the science?

I would say that insurers are better equipped to understand and evaluate the science than most other industries, and they have no particular vested interest in propping up polluting industries. To the contrary, pollution liability is one of the emerging (often insured) risks that keep them up at night. They are also more vulnerable to the impacts; they can't afford to overlook or be wrong about the science. Insurers who have looked at the climate-change issue closely see more burdensome economic costs from inaction than from prudent action, and, in fact, they are developing business opportunities associated with climate-change mitigation and adaptation solutions. They are also quick to recognize that investments in reducing greenhouse-gas emissions can be highly cost-effective in terms of reduced energy expenditures.

Insured losses from weather-related events in 2005 approached \$80 billion (4 times those from 9/11), and that excludes a host of small-scale events that don't appear in the official

statistics. Insurers are the masters of analyzing and coping with uncertainty, and, based on the observed patterns of weather-related losses and [the] state of the art in modeling the future outlook, are increasingly convinced that climate change needs to be addressed. Insurers worked with us as coauthors on the [insurance chapter](#) in the IPCC's Third Assessment Report and are again involved in the Fourth Assessment, to be published next year.

Why didn't the insurance industry protect itself from the disruptive practice by the oil and gas corporations of "manufacturing uncertainty"?

I suppose, in part, because while the energy sector was more or less forced to respond to the climate-change discussion early on, the insurers have, until recently, been focusing their attention on issues they perceived to be more pressing, such as terrorism, asbestos, the mold crisis, and corporate governance. The U.S. insurance industry is much more diverse and fragmented than the fossil-fuel industry. There are thousands of firms in the U.S. alone and many trade associations with different areas of emphasis.

Few insurers in the U.S. have in-house expertise on natural science, enabling the climate contrarians and mixed signals from government to paralyze movement. Insurers also rode the financial market upwards through the 1990s, temporarily feeling invincible as their balance sheets strengthened despite payouts that exceeded premium revenues. And some just saw it as a nonissue, but this is a less frequent view today.

In Europe, most of these distractions are much less operative and the insurers have consequently been much more engaged in looking at climate change. But insurers around the globe are now paying more attention, including the world's largest insurance company ([AIG](#) [MS Word]) and the world's largest insurance broker ([Marsh](#)).

What do insurance executives think will happen to them because of climate change?

Climate change will compound existing demographic forces already pushing losses upwards. The bottom line will be eroded profits, and, in the worst case, insolvency of individual firms. This would come about through a combination of premiums failing to keep pace with rising losses plus market contraction, perhaps even to the degree that they lose their position as the world's largest industry. Meanwhile, their customers and regulators will be disgruntled as insurers tighten their terms and conditions.

Compounding the problem, many of insurers' investments are weather-sensitive, to varying degrees. If extreme weather losses coincide with a downturn in financial markets—a la the Great Drought and Depression of the 1930s—the consequences could be especially dire.

Of particular concern are nonlinear changes in the intensity, frequency, magnitude, or

geographic locus of losses. As a real-world example, according to a letter published in *Nature*, the European heat wave of 2004 was six standard deviations from the norm. Rising uncertainty will confound pricing and reduce insurability in some cases. From an actuarial perspective, abrupt climate change is much more of a challenge to insurers than a stylized view of gradual and linear changes over long time frames.

[Note: RMS (Risk Management Solutions) is the leading provider of natural hazard risk modeling to financial markets.]

Insurers also face various forms of regulatory risk, especially if they do not act on their own to maintain their own solvency or the availability and affordability of their products.

Interestingly, the National Association of Insurance Commissioners just formed an executive-level taskforce to look closely at whether the industry is being sufficiently prudent in its responses to climate change.

Have the models or algorithms that insurers use to project the costs from global warming changed over time?

Actually, insurers rarely build their own models, relying instead on third-party CAT modelers. These CAT modelers have only recently begun to incorporate climate change in their assessments. The results have been startling and are creating a stir, including Warren Buffet's recent [statement](#) that insurance prices will need to be raised significantly because of potential losses from climate change.

It is important to note that many of the impacts of climate change, especially small-scale or gradual-loss events that have enormous aggregate costs—lightning, permafrost melt, mold, drought, or sea-level rise—are poorly (if at all) incorporated in these models. This creates some worrisome blind spots, which I'm afraid will grow larger under climate change.

What did the insurance industry learn from Katrina, and what do they fear will happen to New Orleans in the future?

They [learned](#) [896KB PDF] that their existing models were woefully inadequate for predicting both the nature and magnitude of losses from what they now refer to as super CATs. For example, the combined effect of wind plus flooding losses (CAT following CAT) and subsequent financial losses from mold was not well characterized. Adversely synergistic effects, such as the inability to pump water during protracted power outages, were poorly anticipated. As we now know, this significantly amplified the ultimate loss both in economic and human terms.

Insurers also learned that inadequate responses and ambiguities in the terms and conditions of insurance policies can damage their own reputations. I can't speak for what

insurers think about New Orleans' future, but I expect that we will see some of the more forward looking companies come out in favor of wetlands restoration, better building codes, and more intelligent land-use planning.

What other impacts does the insurance industry expect from climate change?

Impacts will vary depending on which type of insurance products you look at. The most obvious impacts are for property insurers, but business-interruption losses are expected to also be high. Mention has also been made of rising claims through political risk insurance, arising from civil unrest triggered by the effects of climate change. This has been discussed in the Pentagon's [report](#) on abrupt climate change. You also have [litigation](#) against utilities or other polluters, which is already under way in parts of the U.S.

Insured crop losses from any number of factors—temperature, moisture, natural disasters, pestilence, disease—is yet another domain of vulnerability. As explored in our recent [study](#) with the Harvard Medical School, about half of the industry's revenues are from life and health insurance. Climate change can trigger losses from extreme heat episodes, infectious diseases, elevated pollen levels due to "carbon fertilization" of the atmosphere, and the mobilization of pollutants in the wake of natural disasters. Some stakeholders used to say that carbon fertilization would be a welcome impact. Ecosystem impacts, at first blush not perceived relevant to insurers, could have financial consequences such as loss of storm-surge protection resulting from coral reef die-off.

What sectors or regions of the U.S. economy do insurers feel they cannot afford to do business with?

The issue is largely cross-cutting, as evidenced by the near-complete withdrawal of insurers from crop or flood coverage from the heartland to the coasts. These costs are now borne by the government (notable, given that Hurricane Katrina rendered the National Flood Insurance Program insolvent). We have witnessed a variety of regional reactions, especially among insurers from the Gulf and the eastern seaboard. Insurers have increased prices and deductibles and started to withdraw from the region. Some sectors have been particularly hard hit. A prominent example in the wake of the 2005 hurricane season is an up to 500% increase in energy-sector insurance premiums.

How has the business changed its practices to respond to climate change?

Until now, the insurance models were defined by retrospective analysis, in part because this is how the industry thinks but also because regulators have not allowed price

increases based on projected costs; they're based on historical losses.

But because of the increased losses, regulators are looking at the inadequacy of historical models. Massachusetts is now the first state where their regulatory commission is tapping the modeling companies to do forward-looking analyses.

What about mitigation? Is the industry making recommendations, and are they being listened to or ignored?

One thing to get clear, first, is that when insurers use the term "mitigation" they mean loss prevention, while when climate researchers use it they mean emissions reductions. Groups like the Institute for Business and Home Safety do good work to promote improved building codes and the like. Yet, the trillion-dollar insurance industry probably puts only 0.01% of its revenues into such endeavors. They could do much more. Instead, most of the risk management focuses on reactive financial responses, such as tightening terms and conditions or raising prices.

Some industry sectors are now saying, "Well, it's too expensive to reduce GHG production. Let's just practice mitigation." Does this make any sense for the insurers?

Quite the contrary. Leading insurers believe in pursuing both approaches jointly. They recognize that reducing greenhouse gases is a highly cost effective strategy. There are also interesting synergisms between the two approaches.

For example, better forest management [helps sequester carbon](#) while reducing flood and mudslide risks. Also, insurers see real business opportunities, such as introducing new products like [energy-savings insurance](#) or financial and risk-management products associated with carbon trading.

Some predict that the developing world will be hurt more than the U.S. What is expected, and how will this harm business?

This is one of my primary concerns and something we looked at in detail in a recent [study](#) for USAID [the U.S. Agency for International Development]. It is well established that the developing world is particularly vulnerable to the impacts of climate change but adapts less readily than industrialized countries. I was just in Tanzania, where protracted drought has given rise to daily 12-hour power outages. This is having a crippling effect on otherwise vibrant economic activity.

The developing world is the fastest growing insurance market. While "only" \$400 billion in insurance premiums are collected from the developing world today (about 12% of the entire insurance market), this will rise to about half of the market in the next few decades.

However, if insurers react as they have in vulnerable areas of the industrialized world, then this growth could be radically attenuated.

This would translate into a major constraint to development.

—[PAUL D. THACKER](#)

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